

**REMARKS**

This application has been carefully reviewed in light of the Office Action dated March 17, 2004. Claims 13 and 42 have been amended. Claims 18-25 and 41 have been canceled. Claims 13-14, 16-17, and 42 are now pending. Applicants reserve the right to pursue the original claims and other claims in this and other applications. Please reconsider the above-referenced application in light of the amendments and following remarks.

Claims 13, 14, 16, and 17 stand rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the enablement requirement and meet the written description requirement. Claim 13 has been amended to omit claim language reciting that "the ratio of said mixture relative to other gases in said chamber is in the range from about 0.1 to about 0.5." Claims 14 and 16-17 depend from claim 13 and are now compliant with 35 U.S.C. § 112, first paragraph.

Claim 42 stands rejected under 35 U.S.C. § 112, first paragraph as failing to comply with the enablement requirement. Claim 42 has been amended to omit claim language reciting that "the pressure of said rapid thermal process chamber is about atmospheric pressure."

Claims 13, 14, 17, and 42 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Miner.

Miner does not disclose a method of "depositing a dielectric film . . . and subjecting the dielectric film to a wet oxidation with steam process . . . by heating a mixture of hydrogen and oxygen gases in a rapid thermal process chamber at a temperature greater than about 450 °C, wherein said dielectric film undergoes wet oxidation with only a mixture of hydrogen and oxygen gases that form steam, and

wherein the ratio of hydrogen to oxygen gases is in the range from 0.1 to about 0.8," as recited in claim 1 (emphasis added), or a method of "depositing a dielectric film . . . and subjecting the dielectric film to a wet oxidation with steam process . . . by heating a mixture of only hydrogen and oxygen gases . . . at a temperature greater than about 450°C, wherein said mixture is a ratio from 0.1 to approximately 0.80 of hydrogen gas to oxygen gas for a period of about 20 to about 60 seconds," as recited in claim 42 (emphasis added).

Miner discloses in Step 304 a stabilization process carried out by heating the silicon substrate 100 (Col. 8, lines 5-10). The "silicon substrate or wafer 100 is oxidized in NH<sub>3</sub> gas or N<sub>2</sub>O gas at approximately 800°C to form a Si<sub>3</sub>N<sub>4</sub> film or Si<sub>x</sub>N<sub>y</sub>O<sub>z</sub> film on substrate or wafer 100." (Col. 7, lines 59-61) (emphasis added). Miner does not disclose heating a mixture of only hydrogen and oxygen gases.

Claims 14 and 17 depend from claim 13 and are allowable along with claim 13. Withdrawal of the § 102(e) rejection for claims 13, 14, 17, and 42 is solicited.

Claims 13, 14, 16, and 17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Luan in view of Tseng.

Luan discloses that "post-deposition annealing is performed in O<sub>2</sub> or H<sub>2</sub>/O<sub>2</sub> ambient at 600°C to improve film quality and reduce leakage current." (Experiment Paragraph and FIG. 1). Luan, however, does not disclose or suggest subjecting a dielectric film to a wet oxidation with steam process wherein "the ratio of hydrogen to oxygen gases is in the range from 0.1 to about 0.8," as recited in claim 1 (emphasis added), or by heating a mixture which has "a ratio from 0.1 to approximately 0.80 of hydrogen gas to oxygen gas," as recited in claim 42 (emphasis added).

Tseng is relied upon for teaching a wet oxidation temperature in the range of 750-950°C and a ratio of H<sub>2</sub>:O<sub>2</sub> of about 0.03 to 0.09. However, Tseng does not teach or suggest a ratio of H<sub>2</sub>:O<sub>2</sub> to “about 0.09” as asserted by the Office Action (pg. 9). Tseng discloses that “a range of approximately 3% to 9% is expected to obtain comparable results.” (Col. 6, lines 60-63) (emphasis added). Tseng discloses that the preferred percentage is 6%, e.g., lower than 9%. There is no motivation to go higher than 9%. Applicants’ claimed ratio of H<sub>2</sub>:O<sub>2</sub> is from 0.1 to about 0.8. There is no overlap between Applicants’ claimed H<sub>2</sub>:O<sub>2</sub> ratio range and Tseng’s disclosed H<sub>2</sub>:O<sub>2</sub> ratio range. See M.P.E.P. § 2144.05.

Moreover, Applicants respectfully disagree with the Examiner that there is motivation to combine Tseng with Luan. Luan teaches an oxidation temperature of 600°C. Tseng teaches an oxidation temperature of 750-950°C. Luan discloses an oxidation time of 60 seconds (FIG. 1). Tseng discloses an oxidation time of about 15 minutes and it can be changed from about 10 minutes to an hour (Col. 5., lines 62-65).

Tseng’s oxidation time is at least 10 times longer than Luan’s. Tseng’s oxidation temperature is 150°C greater than Luan’s. Moreover, the Office Action acknowledges that Tseng employs a furnace and Luan employs a rapid thermal process chamber. The oxidation is carried out in two different vessels. “The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.” M.P.E.P. § 2143 (emphasis added). There is no suggestion to combine the references with such different parameters. Indeed, the references themselves, because of their disparate process conditions, teach away from the proposed combination.

The Office Action asserts that nowhere does Luan teach that 750°C will not work and that nowhere does Tseng teach that 600°C will not work. Applicants respectfully submit that this is not the standard for a *prima facie* case of obviousness.

There must be some motivation to combine the references. Although both references may disclose oxidation, since the oxidation parameters greatly differ and each reference employs a different oxidation vessel, there is no motivation to combine the two teachings.

The Office Action further asserts that it would be a matter of routine optimization to determine the optimum ratio of hydrogen to oxygen, since Luan clearly teaches the use of hydrogen and oxygen therefore expressly indicating some ratio. "In the case where the claimed ranges 'overlap or lie inside ranges disclosed by the prior art' a *prima facie* case of obviousness exists." M.P.E.P. § 2144.05.

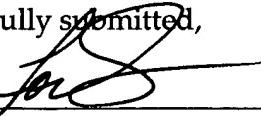
However, Luan does not teach or suggest any ratio for hydrogen to oxygen gas. Tseng merely discloses a ratio to 9%. Further, "[a] prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a *prima facie* case of obviousness." M.P.E.P. § 2144.05. This situation, however, does not exist in either reference. Applicants' claimed H<sub>2</sub>:O<sub>2</sub> ratio range does not fall within Tseng's disclosed H<sub>2</sub>:O<sub>2</sub> ratio range. Luan is simply silent as to a H<sub>2</sub>:O<sub>2</sub> ratio range. "To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." M.P.E.P. § 2143.03. Luan and Tseng do not disclose or suggest Applicants' claimed H<sub>2</sub>:O<sub>2</sub> ratio range of from 0.1 to about 0.8.

Claims 14 and 16-17 depend from independent claim 13 and are allowable along with claim 13. Withdrawal of the § 103(a) rejection is solicited.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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Respectfully submitted,

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